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| 09/854,269 | 05/11/2001 | Thomas H. DiStefano | TESSERA 3.0-139 DIV | 8467 |

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EXAMINER

LEWIS, MONICA

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2822

DATE MAILED: 01/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/854,269

Applicant(s)

DISTEFANO, THOMAS H.

Examiner

Monica Lewis

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 18 November 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the amendment filed November 18, 2002.

Response to Arguments

2. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Lakritz et al. (U.S. Patent No. 4,545,610).

In regards to claim 4, Lakritz discloses the following:

a) first and second elements (10 and 20) having confronting surfaces, pads (12 and 21) on said confronting element arranged in pairs, each such pair including a pad on the first element and a pad on the second element (See Figure 2);

b) solder masses at at least some of said pairs, each such solder mass (38) being associated with the pads of one said pair and extending there between, said solder masses incorporating columnar inclusions therein (See Figure 2); and

c) columnar inclusions within at one of said solder masses being oriented preferentially in the direction between the pads of the associated pair (See Figure 2).

In regards to claim 5, Lakritz discloses the following:

a) solder mass is elongated in the direction between the pads of the associated pair (See Figure 2).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lakritz et al. (U.S. Patent No. 4,545,610) in view of DiStefano et al. (U.S. Patent No. 5,455,390).

In regards to claim 1, Lakritz et al. ("Lakritz") discloses the following:

a) a microelectronic element (20) having a front surface with contact pads (21) thereon (See Figure 2);

b) elongated solder columns (38) extending from said front surface of said microelectronic element, said columns having distal ends remote from said microelectronic element (See Figure 2); and

c) terminals (12) connected to said distal ends of said solder columns (See Figure 2).

In regards to claim 1, Lakritz fails to disclose the following:

a) a flexible dielectric layer having terminals.

However, DiStefano et al. ("DiStefano") discloses a flexible dielectric with terminals (See Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lakritz to include a flexible dielectric with terminals as disclosed in DiStefano because it aids in forming connections to microelectronic units (See Abstract).

Additionally, since Lakritz and DiStefano are both from the same field of endeavor, the purpose disclosed by DiStefano would have been recognized in the pertinent art of Lakritz.

7. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lakritz et al. (U.S. Patent No. 4,545,610) in view of DiStefano et al. (U.S. Patent No. 5,455,390) and Hoffman et al. (U.S. Patent No. 5,578,869).

In regards to claim 2, Lakritz fails to disclose the following:

a) a dielectric packaging structure overlying said front surface of said microelectronic element, said dielectric packaging structure having an interior surface facing toward said microelectronic element and an exterior surface facing away from said microelectronic element, said packaging structure having pads connected to said distal ends of said solder columns and having said terminals thereon connected to the pads of the packaging structure.

However, Hoffman et al. ("Hoffman") discloses a dielectric layer (See Column 6 Lines 60-63). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lakritz to include a dielectric layer as disclosed in Hoffman because it aids in increasing component density (See Figure 3).

Additionally, since Lakritz and Hoffman are both from the same field of endeavor, the purpose disclosed by Hoffman would have been recognized in the pertinent art of Lakritz.

In regards to claim 3, Lakritz fails to disclose the following:

a) a compliant layer surrounding said solder columns, and wherein said packaging structure is a flexible sheet like element.

However, Hoffman discloses a compliant layer (See Column 7 Lines 6-11). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lakritz to include a compliant layer as disclosed in Hoffman because it aids in increasing the reliability of the solder (See Column 7 Lines 6-11).

Additionally, since Lakritz and Hoffman are both from the same field of endeavor, the purpose disclosed by Hoffman would have been recognized in the pertinent art of Lakritz.

8. Claim 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lakritz et al. (U.S. Patent No. 4,545,610) in view of Garner (U.S. Patent No. 4,581,680).

In regards to claim 6, Lakritz discloses the following:

a) the pads of each said pair are spaced apart from one another in a vertical direction normal to the confronting surfaces and offset from one another in a horizontal direction parallel to the confronting surfaces (See Figure 2);

In regards to claim 6, Lakritz fails to disclose the following:

a) elongated solder masses extend oblique to said vertical and horizontal directions.

However, Garner discloses solder masses extended in an oblique direction (See Figure 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Lakritz to include solder masses extended in an oblique direction as disclosed in Garner because it aids in reducing stress on the pads (See Column 1 Lines 38-48).

Additionally, since Lakritz and Garner are both from the same field of endeavor, the purpose disclosed by Garner would have been recognized in the pertinent art of Lakritz.

In regards to claim 7, Lakritz fails to disclose the following:

a) solder masses consist essentially of a lead-tin solder with between about 1% and about 5% copper, and wherein said columnar inclusions constitute a copper-rich phase within said solder masses.

However, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: a) Carey et al. (U.S. Patent No. 5,075,965) discloses a collapse chip attach process; b) Hayes (U.S. Patent No. 6,114,187) discloses a method for forming a chip scale package; c) Blakeslee et al. (European Publication No. 0191434) discloses an improved solder connection; and d) Gabe et al. (UK Patent Application GB 2177643A) discloses an assembly of electronic components.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

January 24, 2003


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800